

# PCT COOPERATION TREATY

## PCT

### NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

United States Patent and Trademark  
Office  
(Box PCT)  
Crystal Plaza 2  
Washington, DC 20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing: 01 April 1999 (01.04.99)	
International application No.: PCT/US98/18785	Applicant's or agent's file reference: Allen 1
International filing date: 10 September 1998 (10.09.98)	Priority date: 25 September 1997 (25.09.97)
Applicant: ALLEN, Martin, W. et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International preliminary Examining Authority on:  
11 February 1999 (11.02.99)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was  
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer:  J. Zahra Telephone No.: (41-22) 338.83.38
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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/18785

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : C03B 37/02, 37/025, 37/07

US CL : 65/381, 382, 435

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 65/381, 382, 435, 486, 491

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,793,840 A (HARDING) 27 December 1988 (27-12-88), see entire document, particularly column 1, lines 32-64, column 2, lines 18-21, 25-30, 54-64, column 3, lines 13-20, and the figure.	1-16
Y	US 5,073,179 A (YOSHIMURA ET AL.) 17 December 1991 (17-12-91), see column 1, lines 54-57.	1-16
Y	US 5,298,047 A (HART, JR. ET AL.) 29 March 1994 (29-03-94), see entire document.	10, 12
Y	JP 59-217642 A (FURUKAWA ELECTRIC CO.) 07 December 1984 (07-12-84), see English abstract.	1-4, 10, 16
A	JP 62-153137 A (SUMITOMO ELEC IND KK) 08 July 1987 (08-07-87), see English abstract.	1-16

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*E* earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*a* document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means	
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

05 NOVEMBER 1998

Date of mailing of the international search report

23 DEC 1998

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

STEVEN P. GRIFFIN

Telephone No. (703) 308-0661

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/18785

## B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

APS, DERWENT

search terms: preform, constant downfeed, down rate, feedrate, feed rate, down speed, rate, speed, polarization mode dispersion, L01-F03G.cpi.

2L  
09/555993  
5L10 3640  
5000 3665

PCT Legal CP2

Cumulative 521016  
CLASS 2 0001213

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

REC'D 20 JUL 2000  
WIPO PCT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference Allen I		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US98/18785	International filing date (day/month/year) 10 SEPTEMBER 1998	Priority date (day/month/year) 25 SEPTEMBER 1997	
International Patent Classification (IPC) or national classification and IPC IPC(7): C03B 37/02, 37/025, 37/07 and US Cl.: 65/381, 382, 435			
Applicant CORNING INCORPORATED			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets.

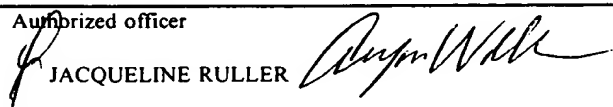
☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

CORRECTED  
VERSION

Date of submission of the demand  11 FEBRUARY 1999	Date of completion of this report  02 DECEMBER 1999
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer  JACQUELINE RULLER
Facsimile No. (703) 305-3230	Telephone No. (703) 308-0651

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/18785

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

- ☐ the international application as originally filed
- ☒ the description:  
pages \_\_\_\_\_ (See Attached) \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☒ the claims:  
pages \_\_\_\_\_ (See Attached) \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, as amended (together with any statement) under Article 19  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☒ the drawings:  
pages \_\_\_\_\_ (See Attached) \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☒ the sequence listing part of the description:  
pages \_\_\_\_\_ (See Attached) \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.  
These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages \_\_\_\_\_ NONE
- ☒ the claims, Nos. \_\_\_\_\_ NONE
- ☒ the drawings, sheets/fig \_\_\_\_\_ NONE

5. ☒ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\*Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/18785

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. statement**

Novelty (N)	Claims <u>1-16</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>7-9 and 13-15</u>	YES
	Claims <u>1-6, 10-12 and 16</u>	NO
Industrial Applicability (IA)	Claims <u>1-16</u>	YES
	Claims <u>NONE</u>	NO

**2. citations and explanations (Rule 70.7)**

Claims 1-6, 11, and 16 lack an inventive step under PCT Article 33(3) as being obvious over Harding 4,793,840 in view of Yoshimura et al. 5,073,179.

Harding discloses forming an optical fiber by feeding an optical fiber preform 1 at predetermined first rate and drawing an optical fiber from the preform at a predetermined second rate utilizing the capstan drive 25. Harding also discloses that the diameter is monitored as it is drawn and the diameter measured is compared to a preset diameter and the speed of the capstan is controlled and adjusted in response to this comparison/monitoring in order to keep a constant fiber diameter during drawing while the downfeed rate of the preform is kept constant. In Harding see particularly col. 1, lines 32-64, col. 2, lines 16-29 and 54-64, and col. 3, lines 13-20. Harding fails to disclose that the drawing speed is at least 10 m/sec. High drawing speeds over 10 m/sec are known such as in Yoshimura et al. which discloses that drawing speeds of up to 1000 m/min (i.e. 16.67 m/sec) are known in the art. Thus, it is considered that it would have been obvious to one having ordinary skill in the art at the time the invention was made that the drawing of Harding is capable of being operated at known drawing speeds, such as the speeds discussed in Yoshimura, with the reasonable expectation of producing a drawn optical fiber having a constant diameter. Regarding the recitation that the draw speeds are defined within zones it is considered that the various speeds of Harding make up draw speed zones. Regarding varying of the downfeed rate, Harding suggests that the downfeed rate of the preform can be varied along with the drawing rate.

Claims 10 and 12 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Hart, Jr. et al. 5,298,047. Hart, Jr. discloses that the spinning of fiber during drawing can reduce PMD. Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to spin the fiber during the drawing as in the combination of Harding/Yoshimura in order to (Continued on Supplemental Sheet.)

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/18785

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

**I. BASIS OF REPORT:**

This report has been drawn on the basis of the description,  
page(s) 1-11, as originally filed.  
page(s) NONE, filed with the demand.  
and additional amendments:  
NONE

This report has been drawn on the basis of the claims,  
page(s) NONE, as originally filed.  
page(s) NONE, as amended under Article 19.  
page(s) NONE, filed with the demand.  
and additional amendments:  
Pages 12-14, filed with the letter of 03 February 2000.

This report has been drawn on the basis of the drawings,  
page(s) 1, as originally filed.  
page(s) NONE, filed with the demand.  
and additional amendments:  
NONE

This report has been drawn on the basis of the sequence listing part of the description:  
page(s) NONE, as originally filed.  
pages(s) NONE, filed with the demand.  
and additional amendments:  
NONE

5. (Some) amendments are considered to go beyond the disclosure as filed:  
NONE

**V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):**  
substantially reduce PMD.

Claims 7-9 and 13-15 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest - the downfeed rate being different in each draw speed zone (claim 7 and 14-15); the decreasing of the downfeed rate as the draw rate changes from one zone to another having a higher range of draw speeds (claim 8); the increasing of the downfeed rate as the draw rate changes from one zone to another having a lower range of draw speeds (claim 9); a plurality of draw rate zones with each zone comprising a predetermined range of draw speeds (claim 13).

Claims 1-16 meet the criteria set out in PCT Article 33(2)-(4), because the invention is industrially applicable to the formation of optical fibers.

----- NEW CITATIONS -----

NONE

CLAIMS

We Claim:

1. A method for reducing polarization mode dispersion in drawn optical fiber comprising the steps of:

5 feeding an optical fiber preform of a predetermined size into a furnace at a predetermined downfeed rate;

drawing an optical fiber from the optical fiber preform at a draw rate of at least 10 meters per second; and

10 varying the draw rate to maintain a substantially constant fiber diameter while maintaining the predetermined downfeed rate constant.

2. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 1, wherein the draw rate is greater than 14 meters per second.

15 3. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 2, wherein the draw rate is varied between about 14 and 20 meters per second.

20 4. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 1, wherein the draw rate is varied between about 14 and 20 meters per second.

25 5. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 4, further comprising the step of defining at least one zone of draw speeds.

30 6. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 5, wherein as the draw speed varies in each zone, the downfeed rate remains constant within each zone.



7. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 6, wherein the downfeed rate is different for each zone.

5 8. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 7, wherein as the draw rate changes from one zone to another having a higher range of draw speeds, the downfeed rate decreases.

10 9. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 7, wherein as the draw rate changes from one zone to another having a lower range of draw speeds, the downfeed rate increases.

10. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 1, wherein the fiber is spun as it is drawn.

15 11. A method for drawing optical fiber from an optical fiber preform comprising the steps of:

feeding the optical fiber preform of a predetermined size into a draw furnace having a plurality of zones at a downfeed rate;

20 drawing optical fiber from the optical fiber preform at a draw rate of at least 10 meters per second;

measuring the drawn fiber diameter and generating a signal representative of the measured diameter;

comparing the generated signal to nominal fiber diameter value and generating a second signal representative of the difference of the comparison;

25 sensing the draw rate to determine if it is within a range of predetermined speed;

varying the draw rate based on the second signal to adjust the drawn fiber diameter; and

varying the downfeed rate if the sensed draw rate is outside of the range.

14

12. The method of drawing optical fiber according to claim 11, comprising the further step of spinning the optical fiber as it is drawn.

5 13. The method of drawing optical fiber according to claim 11, wherein the draw rate comprises a plurality of ranges, each range comprising a predetermined range of draw speeds.

10 14. The method of drawing optical fiber according to claim 13, wherein as the draw rate is varied between the plurality of ranges, the downfeed rate is changed.

15 15. The method of drawing optical fiber according to claim 14, wherein the downfeed rate is maintained substantially constant while in each zone.

16. A method for reducing polarization mode dispersion in drawn optical fiber comprising the steps of:

feeding an optical fiber preform of a predetermined diameter into a furnace at a constant downfeed rate;

20 drawing an optical fiber from the optical fiber preform at a draw rate of at least 10 meters per second; and

varying the draw rate to maintain a substantially constant fiber diameter.

## PCT

WIPO

PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

17

Applicant's or agent's file reference Allen 1	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US98/18785	International filing date (day/month/year) 10 SEPTEMBER 1998	Priority date (day/month/year) 25 SEPTEMBER 1997
International Patent Classification (IPC) or national classification and IPC IPC(6): C03B 37/02, 37/025, 37/07 and US Cl.: 65/381, 382, 435		
Applicant CORNING INCORPORATED		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>5</u> sheets.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>0</u> sheets.</p>
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step or industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input checked="" type="checkbox"/> Certain observations on the international application</p>

Date of submission of the demand 11 FEBRUARY 1999	Date of completion of this report 02 DECEMBER 1999
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer JACQUELINE RULLER <i>Jeane Walker</i> Telephone No. (703) 308-0651

**I. Basis of the report**

1. This report has been drawn on the basis of *(Substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments)*:

☒ the international application as originally filed.

☒ the description, pages 1-11, as originally filed.

pages NONE, filed with the demand.

pages NONE, filed with the letter of \_\_\_\_\_.

pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

☒ the claims, Nos. 1-16, as originally filed.

Nos. NONE, as amended under Article 19.

Nos. NONE, filed with the demand.

Nos. NONE, filed with the letter of \_\_\_\_\_.

Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

☒ the drawings, sheets/fig 1, as originally filed.

sheets/fig NONE, filed with the demand.

sheets/fig NONE, filed with the letter of \_\_\_\_\_.

sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

2. The amendments have resulted in the cancellation of:

☒ the description, pages none.

☒ the claims, Nos. none.

☒ the drawings, sheets/fig none.

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box. Additional observations below (Rule 70.2(c)).

4. Additional observations, if necessary:

NONE

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/18785

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. STATEMENT**

Novelty (N)	Claims <u>1-16</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>7-9 and 13-15</u>	YES
	Claims <u>1-6, 10-12 and 16</u>	NO
Industrial Applicability (IA)	Claims <u>1-16</u>	YES
	Claims <u>NONE</u>	NO

**2. CITATIONS AND EXPLANATIONS**

Claims 1-6, 11, and 16 lack an inventive step under PCT Article 33(3) as being obvious over Harding 4,793,840 in view of Yoshimura et al. 5,073,179.

Harding discloses forming an optical fiber by feeding an optical fiber preform 1 at predetermined first rate and drawing an optical fiber from the preform at a predetermined second rate utilizing the capstan drive 25. Harding also discloses that the diameter is monitored as it is drawn and the diameter measured is compared to a preset diameter and the speed of the capstan is controlled and adjusted in response to this comparison/monitoring in order to keep a constant fiber diameter during drawing while the downfeed rate of the preform is kept constant. In Harding see particularly col. 1, lines 32-64, col. 2, lines 16-29 and 54-64, and col. 3, lines 13-20. Harding fails to disclose that the drawing speed is at least 10 m/sec. High drawing speeds over 10 m/sec are known such as in Yoshimura et al. which discloses that drawing speeds of up to 1000 m/min (i.e. 16.67 m/sec) are known in the art. Thus, it is considered that it would have been obvious to one having ordinary skill in the art at the time the invention was made that the drawing of Harding is capable of being operated at known drawing speeds, such as the speeds discussed in Yoshimura, with the reasonable expectation of producing a drawn optical fiber having a constant diameter. Regarding the recitation that the draw speeds are defined within zones it is considered that the various speeds of Harding make up draw speed zones. Regarding varying of the downfeed rate, Harding suggests that the downfeed rate of the preform can be varied along with the drawing rate.

Claims 10 and 12 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Hart, Jr. et al. 5,298,047. Hart, Jr. discloses that the spinning of fiber during drawing can reduce PMD. Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to spin the fiber during the drawing as in the combination of Harding/Yoshimura in order to (Continued on Supplemental Sheet.)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/18785

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 1-10 and 15-16 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because the claims are indefinite for the following reason(s): Claim 1, line 8, "the predetermined downfeed rate" lacks antecedent basis. Claims 3 and 4 render the claims indefinite as it is not clear how they differ from each other, they appear to be duplicates. Claim 6, lines 2-3, "the down feed rate" lacks antecedent basis as there has not been a positive recitation of --a down feed rate-- and previous recitations of down feed rates have been as one word "downfeed". Claim 7, line 2, claim 8, line 3, and claim 9, line 3, "the downfeed rate" lacks antecedent basis as it has not been positively recited. Claim 15, "consent" appears to be a typographic error and should be --constant-- and "while each zone" appears to be missing something so as to make it understandable in the context of the claim. Claim 16, "reform" appears to be typographic error and "draw rate maintain" appears to be missing something so as to make it understandable in the context of the claim.

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

**V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):**  
substantially reduce PMD.

Claims 7-9 and 13-15 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest - the downfeed rate being different in each draw speed zone (claim 7 and 14-15); the decreasing of the downfeed rate as the draw rate changes from one zone to another having a higher range of draw speeds (claim 8); the increasing of the downfeed rate as the draw rate changes from one zone to another having a lower range of draw speeds (claim 9); a plurality of draw rate zones with each zone comprising a predetermined range of draw speeds (claim 13).

Claims 1-16 meet the criteria set out in PCT Article 33(2)-(4), because the invention is industrially applicable to the formation of optical fibers.

NEW CITATIONS

NONE

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
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CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						



**REPLACED BY  
ART 34 AMDT**CLAIMS

We Claim:

1. A method for reducing polarization mode dispersion in drawn optical fiber comprising the steps of:
  - 5 feeding an optical fiber preform of a predetermined size into a furnace at a predetermined down rate;  
drawing an optical fiber from the optical fiber preform at a draw rate of at least 10 meters per second; and  
varying the draw rate to maintain a substantially constant fiber diameter  
10 while maintaining the predetermined downfeed rate constant.
2. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 1, wherein the draw rate is greater than 14 meters per second.  
15
3. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 1, wherein the draw rate is varied between about 14 and 20 meters per second.
- 20 4. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 1, wherein the draw rate is varied between about 14 and 20 meters per second.
- 25 5. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 4, further comprising the step of defining at least one zone of draw speeds.
- 30 6. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 5, wherein as the draw speed varies in each zone, the down feed rate remains constant within each zone.

7. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 6, wherein the downfeed rate is different for each zone.
- 5 8. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 7, wherein as the draw rate changes from one zone to another having a higher range of draw speeds, the downfeed rate decreases.
9. A method for reducing polarization mode dispersion in drawn optical  
10 fiber according to claim 7, wherein as the draw rate changes from one zone to another having a lower range of draw speeds, the downfeed rate increases.
10. A method for reducing polarization mode dispersion in drawn optical fiber according to claim 1, wherein the fiber is spun as it is drawn.
- 15 11. A method for drawing optical fiber from an optical fiber preform comprising the steps of:
- feeding the optical fiber preform of a predetermined size into a draw furnace at a downfeed rate;
- 20 drawing optical fiber from the optical fiber preform at a draw rate of at least 10 meters per second;
- measuring the drawn fiber diameter and generating a signal representative of the measured diameter;
- comparing the generated signal to nominal fiber diameter value and  
25 generating a second signal representative of the difference of the comparison;
- sensing the draw rate to determine if it is within a zone of predetermined speed;
- varying the draw rate based on the second signal to adjust the drawn fiber diameter; and
- 30 varying the downfeed rate if the sensed draw rate is outside of the zone.

12. The method of drawing optical fiber according to claim 11, comprising the further step of spinning the optical fiber as it is drawn.
13. The method of drawing optical fiber according to claim 11, wherein the  
5 draw rate comprises a plurality of zones, each zone comprising a predetermined range of draw speeds.
14. The method of drawing optical fiber according to claim 13, wherein as the  
10 draw rate is varied between the plurality of zones, the downfeed rate is changed.
15. The method of drawing optical fiber according to claim 14, wherein the down feed rate is maintained substantially constant while each zone.
- 15 16. A method for reducing polarization mode dispersion in drawn optical fiber comprising the steps of:
- feeding an optical fiber reform of a predetermined diameter into a furnace at a constant downfeed rate;
- drawing an optical fiber from the optical fiber preform at a draw rate of at  
20 least 10 meters per second; and
- varying the draw rate maintain a substantially constant fiber diameter.